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FOUNDED BY WILLIAM HUNTING, F.R.C.V.S.

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IMMUNISATION EXPERIMENTS IN SCOTLAND.

This week we print a short report of some experiments in immunisation against epizootic abortion which have been carried out in Ayrshire, with the same encouraging results that have attended those done in various counties in England. It is noteworthy that the success of the Ayrshire experiments has led to their continuance this year upon a larger scale; and this is just what is most wanted. Everything augurs well for immunisation; but it is essential that we should have statistics of its testing in a great many herds—and, considering the prevalence of abortion, there ought to be no difficulty in obtaining these. The probability is that there is more or less of the disease in every county in the island except the metropolitan one; and it is quite certain that the great majority of counties each holds enough infection to supply invaluable material for immunisation experiments. Whether that material is utilised quickly depends solely upon the initiative of agriculturists and veterinarians.

EPSOM SALTS.

Already one experienced clinician in Mr. A. New has expressed agreement with Mr. W. R. Davis in his abandonment of magnesium sulphate as a bovine purgative. Probably the profession contains plenty more members of the same way of thinking, some of whom may give their views; and perhaps some of those who still hold to the old drug may find something to say for it. Naturally, such a discussion would involve the consideration of a good many of the bovine digestive disorders, and this would not be unprofitable, for their diagnosis, therapy, and general management are full of debatable points. Obscure and difficult as equine digestive diseases are, bovine ones are more so; and are certainly the more imperfectly understood by the majority of practitioners. Incidentally we might learn a good deal regarding them while discussing the value of the drug that is still the sheet anchor in their treatment for many veterinary surgeons and nearly all empirics. Mr. New's note illustrates that—commencing with stating his views upon magnesium sulphate, he goes on to outline a treatment of atonic impaction of the rumen which may be helpful to some clinicians. The importance of the main question—the place magnesium sulphate ought to hold in bovine medicine—needs no emphasis.

A TREATMENT FOR HORSE SICKNESS.

During a recent outbreak of a disease amongst the mules of the —th Mountain Battery at ——, the diagnosis of which was that of horse sickness, I was fortunate enough to obtain a certain amount of success in the treatment of the cases occurring.

In asking you to publish this note, I hope that some other practitioner may be interested enough to try the method, with, I trust, the same or a greater measure of success than I obtained.

Mules.	Treated: (Died 13. Recovered 30)		43
	Untreated:	Died	8—51
Ponies.	Treated:	Recovered	2
	Untreated:	Died	1— 3

In addition to above cases, two Abyssinian mules became infected. The first was *in extremis*, showing all the symptoms of acute dunkop; it was shot, untreated.

The other when seen was blowing, in distress with a temperature of 104·6° F. Although I did not anticipate any success, I at once proceeded with treatment as indicated below. I must admit that it was with astonishment that I was able to return the mule to duty within a fortnight.

It was this last case that decided me to send in my experience, as it occurred 15 months after the battery mules, and in an entirely different locality.

The companion animal to above was reported ill one evening, but before I could get to treat it, it died and was buried. Period of illness was 24 hours.

Treatment. I felt certain that if one was to make any headway against this outbreak early treatment was essential, and in consequence I took temperatures daily, segregating any that showed a rise of more than 1½ degrees. Animals off their food, showing slight colicky pains, etc., were at once sent to the sick lines, and treatment proceeded with.

This proved to be a wise procedure, as every case so treated developed well marked symptoms within three days.

Quinine was administered in doses of 1½ drachm, followed by 1 drachm 12 hours later, given *per os*. As I had to make up each ball and administer it myself, doing as many as 30 daily, I speedily gave up this method for that of intramuscular injections.

40 gr in 6 c.c. slightly acidulated solution of warm water, injected into the middle gluteus, half-way between the angle of the haunch and the root of the tail.

Strychnine 1 gr, and occasionally whisky, was given subcutaneously in cases of collapse.

Over 100 injections were given, and in only one case was there any marked swelling with pain. On fomentations being applied, this disappeared in a few days. In order to save the patient distress, the injection was given standing, the hind legs being shackled; practically no pain seemed to attend the operation.

Mag. sulph. 2 oz was added to the water, which was slightly warmed. Diet consisted of boiled gram and bran, with dried grass.

In every case hot compresses were put on immediately, being replaced every four hours until the breathing was relieved and blowing diminished. The relief obtained by this was very marked indeed, of course provided that the sacks (the material used) were wrung out very thoroughly. Bandages were put all round, absolute rest insisted on, and shelters built as a protection against sun, rain, etc.

There has been a query as to whether the condition was really one of horse sickness. One cannot positively assert that it was. Active service does not lend itself to experimental and laboratory work; all one *can state* is that all the symptoms were those of horse sickness, the diagnosis being borne out by post-mortem examination, and further upheld by the absence of any abnormality in the blood slides examined. Further, all the untreated died, which seems to indicate that there may be something in this method.

I would like to emphasise that I do not state that this is a cure for horse sickness, but that I have had a curious experience which I hope may be shared by others. Should anyone be sufficiently interested in the foregoing, I should be glad to give further details of the cases treated.

Kampala, Uganda. W. F. POULTON, Capt. (temp.)
(To be forwarded).

EPSOM SALTS IN CATTLE PRACTICE.

By ARTHUR NEW, M.R.C.V.S, Ashton-under-Lyne.

The notes on this subject by Mr. W. R. Davis, M.R.C.V.S., confirm my experience. I have not used Epsom salts in cases of stomach derangement in cattle for years. By far the majority of cases of impaction which we get in dairy districts, where heavy feeding is resorted to, are due to the rumen becoming more or less paralysed and unable to work upon its contents, and the administration of large doses of Mag. sulph., although in a good many cases it will cause a large watery evacuation, does not restore tone to the rumen, and frequently results in inflammation of the fourth stomach. The best method of treating impaction I have found to be Aloes Barb. ʒi, Sodii bicarb. ʒss, boiled together in ʒx aqua, and when cold add ʒi Ol. menth. pip. Of these drenches I keep several ready made: they will keep their strength for about a month; they then deposit resins in the bottle and should not be relied upon.

In attending a case of impaction I give one of these drenches with a dose of stimulating medicine made up of:

Æther meth.	ʒss.
Spt. vini meth.	ʒi.
Liq. strych.	ʒss.
Infus. gentian co.	ʒss.

and have the stimulating drenches repeated in warm ale every three or four hours, until the stomach has regained its tone and the animal begins cudding. The purgative dose may be repeated in 24 hours if necessary.

I have had very few cases of impaction that have not rapidly yielded to this treatment.

UNDIAGNOSED ABSCESS.

Subject, a fine specimen of a South Hams cow, aged nine years. Had six calves, the last about a month since: after the calving she was able to rise only w.th difficulty, and at times looked back at the lumbar region—not to the side. Prior to calving she had moved slowly and stiffly.

On the third day after parturition, which was normal, she died somewhat suddenly: the calf was healthy and lived.

Post-mortem, I found that an abscess had matured and burst in the region of the left kidney. This affected the blood circulation. The heart failed: there were blood clots in the ventricles.

The history of the case was not noted until the climax. The cow had received an injury to the loins, thought to have been caused by a blow from a tree falling on it in the orchard in a storm. There was a very firm enlargement on the back, directly over the loins in front of the croup and at the junction of the pelvis with the lumbar vertebræ. It did not apparently interfere with the health of the cow, and as she was a good milker, no heed was given.

It was noticed, however, that the cow in rising always rose on her fore quarters first, like a horse. This she had done for about four years: no doubt on account of the injury to the back the way she chose to rise was the easier.

Plymouth. P. G. BOND, M.R.C.V.S.

ABSTRACTS FROM FOREIGN JOURNALS.

THE CLINICAL IMPORTANCE OF CHOLEASTOMATA IN THE HORSE

Wyssmann, in 1915, published an article upon these neoplasms of the choroid plexus of the horse (*Schweizer Archiv. für Tierheilk.*). He gives a succint review of the German, French, and some English writings on the subject, from which he draws the following conclusions. These various practical communications prove that choleastomata may provoke serious acute or chronic alterations in the encephalic functions. The frequence of these tumours in the lateral ventricles, which is estimated by authors at from 22.5% to 66% of all horses, well exceeds the number of cases in which they determine clinical evidence of disease. It is

also notable that, in the cases described hitherto, the tumours found post-mortem in one or both cerebral ventricles have always exceeded the size of a hen's egg; while the smaller choleastomata, which, according to Dexler and others, are so common, do not cause symptoms of disease.

It seems, then, that the tumours, to produce encephalic disturbance, must attain a certain volume. Their presence then augments the endocranial pressure, and may do so to the extent of atrophying the cerebral substance, dilating the ventricles, and flattening the corpora striata. If their growth is rapid, it may cause symptoms of irritation of the cerebellum; while a slow growth may permit a gradual adaptation to the new conditions of pressure; and the case thus presents symptoms of a chronic disease. External agents, such as heat, exertion, etc., may influence the etiology.—(*Revista de Hygiene y Sanidad Veterinaria*).

Epithelioma in the Mouth of a Horse.

Wirth has recorded the case of a horse brought to the clinique of the Vienna Veterinary School, with a bilateral nasal discharge—(*Œster. Monat. Tier.*). He was treated for strangles, but in a few days the condition became worse. The mallein test (ophthalmo-reaction and cuti-reaction) gave negative results. Death supervened from gangrenous pneumonia.

Post-mortem, the retropharyngeal glands were found to be the size of a goose's egg, and in contiguity with a tumour which extended from the left principal branch of the hyoid bone through all the fleshy mass of the base of the tongue. Microscopic examination of the tumour demonstrated its epithelial nature. The case is chiefly interesting from the rare localisation of the epithelioma.—(*Revista de Vétérinaria Militar.*)

Fibroma of the Tongue in a young Ox.

Actinomycotic tumours of the bovine tongue are very common, but other tumours of this region are rare. Kitt once observed a pad-shaped fibroma about 7½ inches long by 4 inches broad, and of wooden hardness, in the tongue of an ox. Vogt, an abattoir director at Weissenfels, has observed and recorded a similar case.

The subject of Vogt's observation was a young ox, about eighteen months old and in moderately good condition, which was slaughtered at his abattoir. The body of the tongue showed a marked increase of circumference, due to the presence of a tumour about 6 in. long, 4⅜ in. high, and 3⅜ in. broad. This tumour was sharply defined from the surrounding tissues, and possessed no capsule. It was yellowish-white in colour, and of tendinous hardness. It was traversed by tendinous fibres which ran from above downwards, and formed inferiorly a reticular tissue similar to the tongue muscle itself, which at this place had nearly the same course. No granular deposits were found in it. The point of the tongue, and its posterior portion also were quite normal.

The glands of the throat showed a marrowy swelling. The lower cervical glands were also swollen, and one showed tendinous strands in the glandular tissue, indicating that the tissue elements of the tumour had travelled by metastasis to the glands.

Vogt histologically examined sections of the tumour and the immediately adjacent tissues of the tongue, and gives a detailed description of the results. These showed that the tumour was undoubtedly a fibroma.—(*Berliner Tier. Woch.*)

Progressive Hemiplegia of Melanotic Origin.

Among the different clinical manifestations of melanosis, those of the nervous system are the most interesting and the most varied. This is due to the fact that they arise either from a compression of nervous structures *en masse*, or from an infiltration across the nervous tissues. In the first case, the tumours grow in the connective tissue which surrounds the meninges, compress the nervous centres, and enter into intimate connection with these, causing atrophy of their elements. In the second case, there is an infiltration into the nervous substance itself. In the medulla oblongata and the cerebellum, every section seems as if sprinkled with fine coal-dust.

This transportation of melanin, in the horse, undoubtedly occurs by the lymphatic channel, from glands which have been invaded primarily.

Lardeyret has recorded a case observed by him in a horse, in which the granulations were accumulated in the left half of the bulb and of the protruberance in the form of a blackish speckling (*Rev. Vét. Mil.*). Their presence in so important a region explains the symptoms of progressive paralysis which the horse had shown during life.

The animal became worse little by little. At first, a slackness of the right hind limb appeared, and then a true paralysis with an impeded flexion of the joints. Later the disturbance became manifest in the right fore limb also; and there was a true right lateral hemiplepia. The horse moved with effort, and did so "like a drunken man." There was, however, no psychic disturbance; and the physiognomy and also the digestive functions remained normal. Then progression became impossible; and the animal was slaughtered when deglutition commenced to be difficult. If the horse had been preserved alive some time longer, undoubtedly the complete evolution of a "crossed hemiplegia" would have been observed; for the signs of nervous dysphagia were the initiation of labio-glosso-laryngeal paralysis, which was necessary to complete the classic clinical picture of hemiplegia.

Post-mortem, the lesions mentioned above were noted. The granulations of melanin were disseminated upon the fibres of the motor pyramidal bundle, the function of which is well known to be specially important in the transmission of motor excitations.

The horse was seventeen years old, and did not present an abnormal degree of melanodermia, though some melanic islets were observed.—(*La Clinica Veterinaria.*)

W. R. C.

EPIZOOTIC ABORTION EXPERIMENTS IN AYRSHIRE.

17 Wellington Square, Ayr,
25th November, 1915.

To
The Ayrshire Branch of the National Farmers Union of Scotland.

Gentlemen,

I have been requested to furnish you with a report of the experiment conducted by my son during the winter of 1914–15, with consent of the Executive Committee of the County Council, for the preventative treatment of Contagious Abortion in cows by immunisation with Anti-abortion A Vaccine as supplied by Sir Stewart Stockman, Chief Veterinary Officer of the Board of Agriculture and Fisheries.

As the experiment was not finished till April, 1915, and as cows should not be served until two months after the treatment, it will be seen that this can only be an interim report, but as the work was started in November, 1914, sufficient is now known to show the beneficial results obtained from the treatment, as at several farms visited last week a few cows have calved at full time, and a large number of December calvers are evidently going full time.

The following statistics will show the results of the experiment:—

At twenty-three farms in various parts of Ayrshire, where abortion had been more or less prevalent, there were four hundred and ninety-three animals treated, of which six are reported to have aborted, giving a percentage of one and a fraction (1·217).

Two heifers that were sold in the early summer as back calvers and removed from the farms are reported to have aborted; these are not included in above.

Seventeen out of three hundred and sixty-eight animals left as controls or untreated have aborted, showing a much larger percentage amongst them (4.619), but this, as well as the other section, will be left uncompleted until the end of the year. But as at some farms only the heifers or young stock were treated, or the more suspicious cases, the comparison is so far even better than percentages show.

One other important fact which has been almost universally commented upon and emphasised remains to be stated, that is, that the cows have settled more readily than formerly, very few animals remaining barren.

4th July, 1916.

In continuance of my report furnished to you on the 25th November, by request, regarding the preventative treatment or immunisation of cattle with Anti-abortion Vaccine as supplied by the Chief Veterinary Officer of the Board of Agriculture and Fisheries.

As then stated, there were four hundred and ninety-three animals treated at twenty-three different farms. The experiment for that season may now be considered as finished; the following is the net result:—

Twenty-two vaccinated animals have aborted, showing four per cent. (4·462).

When it is stated that at least seventy-five per cent. of the same class of animals had aborted the previous year, the result must be considered highly satisfactory.

Eleven of the farms previously affected remain clear, and only one at each of other seven farms aborted, the remaining fifteen cases being at five farms. Thus we leave the supposed control animals out of account, there being very few of *the same class* left untreated.

I beg to state also that during the season 1915–16, I have vaccinated six hundred and four animals at thirty-two different farms.

T. A. Douglas, County Vety. Inspector.

Epizootic Abortion in Devon.

Replying to Sir J. Spear in the House of Commons on Monday, Mr. Acland stated that the number of outbreaks of epizootic abortion in county of Devon in the years 1912, 1913, 1914 and 1915 were 775, 1039, 642 and 659 respectively. It was true that the Order required the isolation and detention of diseased animals, and the cleansing and disinfection of diseased animals, and the premises in which they had been kept, and in so far was doubtless of advantage; but the Board, as at present advised, were doubtful whether the cost of the administration of the Order to the local authority would be fully justified when the arrangements for the supply of vaccine for vaccination against the disease from the Board's laboratory to all applicants were completed. The Board hoped that this would be at no very distant date, when they would enquire more fully into the working of the Devon Order and advise the local authority as to steps which might be taken then to deal with the disease in the county. A certain amount of vaccine was obtainable at the present time on application at the Board's office, and there was no reason why Devon farmers should not avail themselves of it more than they did at present.

Arguments in favour of the theory that Hæmaturia in Cattle is a Dietetic Disease, by Seymour Hadwen, D.V.Sc., Pathologist in charge Veterinary Research Laboratory, Agassiz, B.C.

The cause of hæmaturia has long been looked for in vain; many theories have been advanced and refuted, so that it is natural for me to be conservative in what I am about to say, and in interpreting the results of the experiments I have lately been conducting. Before going any further, I should like to mention the valuable help given to me by Dr. W. E. Dixon, the toxicologist of Cambridge University; he it was who helped me to formulate the ideas I now hold on the subject.

Experiments were undertaken to prove that oxalic acid in plants played an important part in producing hæmaturia in cattle. The experiments were divided under two heads; one the injection of calcium oxalate crystals into the bladder, the other the feeding of oxalic acid by the mouth.

In experimental injections into the bladder of calcium oxalate crystals, the animals evinced great irritation, and, after several injections, made on consecutive days, straining became more marked and finally bloody urine was passed. This proves conclusively that calcium oxalate crystals can wound the walls of the bladder sufficiently to cause hæmorrhage. These experiments have been made with four different animals.

Calcium oxalate crystals have been demonstrated in many cases of hæmaturia in this country, and I found them also in a specimen I brought back with me from France. Their numbers are often small, but I have already shown that the disease takes, on an average, six years to develop; thus it is probable that the constant irritation of these crystals, even when present in small numbers, may eventually produce hæmaturia. Nearly all the experimenters who have worked on hæmaturia say that the bladder lesions are undoubtedly the result of prolonged irritation. An interesting point which I have not seen mentioned is that the majority of the lesions found in the bladder are in the most dependent parts; this suggests that the irritant falls to the lowest parts of the organ in the same way that calcium oxalate crystals fall to the bottom of a beaker.

The results of feeding oxalic acid by the mouth have been less satisfactory in producing hæmaturia. Oxalic acid is toxic for the first few doses, but very soon the

animals develop a toleration for the drug and can take very large doses. The effects on the urine are apparent from the first. Albumin is seen, and epithelial cells become numerous after sedimentation. Red blood corpuscles also appear in smaller numbers; in some cases they are in sufficient quantities to be visible to the naked eye. Calcium oxalate crystals are numerous. Three calves and a cow were experimented on. It is a fact that, under natural conditions, young animals under two years of age rarely contract the disease. In my own experience I have never seen such a case, but have heard of one or two at eighteen months. This age limit supports the theory that young animals which drink milk are not affected. At first they do not take green food at all; later when they begin to do so, the lime which is in the milk would be sufficient to cause the oxalic acid in the plant to be turned into calcium oxalate and eliminate it as such in the fœces. It is possible that the hydrochloric acid which is present in the digestive juices may be strong enough to act on some of the oxalates found in the plants, converting these into oxalic acid. If this is so, the lime would neutralise this effect. No experiments have been made to prove or disprove this point.

In the experiments I have been conducting of giving oxalic acid by the mouth, a large percentage of it must be eliminated in this way; but, when there is too much for the lime in the food to act on, a certain amount of the free acid must be absorbed; hence the crystals are probably formed somewhere in the urinary tract, when the acid comes in contact with the mucous or other fluids which turn it into calcium oxalate. Arguing from this point, one would expect to find that animals which are given oxalic acid would be stunted and not grow like other animals. This is undoubtedly the case; the animals one finds in the redwater districts, if born and raised there, are usually undersized. Experimentally, I have shown this in the case of two young bulls.

In treating cases of hæmaturia, I have found that lime salts, such as calcium chloride, calcium lactate, and ordinary lime, help animals. In several cases I have seen the blood clotting properties raised. These drugs at one time were largely used in cases of hæmophilia, but now are not held in much esteem. It may be that the improvement I noticed was in reality produced by the action of calcium on the oxalic acid, as it is well known that oxalic acid retards the coagulation of blood. Medical men have long known that acid fruits and vegetables are harmful to some people, and there is much literature on the subject.* I have heard of cases where the ingestion of rhubarb caused smarting and burning after urination, and occasionally red cells were found on sedimenting the urine. In cases of oxalic acid poisoning in man, hæmaturia has been seen and bleeding along the alimentary tract. During the course of my experiments I have observed the irritating nature of the crystals, and have seen blood stained saliva coming from the mouth, and bloody fæces. These are the main facts I have learned from my experiment; in the field, my observations also lend support to them. On this very farm, twenty years ago there used to be many cases of hæmaturia. The land was then newly cleared, and I am told that all the fields were very sour; it is now fourteen years since there has been a case. I could mention very many cases of this sort. Hæmaturia is undoubtedly a poor man's disease, and occurs in new districts. I have seen it leave a farm in two or three years, notwithstanding the fact that the descendants of original cattle remained on it. This disappearance followed clearing operations and cultivation. On other farms, where the disease is more or less permanent, one finds that the cattle are still allowed to roam at large in the woods or in partially cleared lands; but, as soon as the owner keeps his animals under fence, cultivates his land and feeds them better, the disease vanishes.

A curious and very important fact, which is well known to the farmers of this province, is the absence of hæmaturia on the Delta lands at the mouth of the Fraser river. The reason for this is obvious; the soil forming this delta came from the uplands of British Columbia, which are of a totally different character; no cases of hæmaturia are to be found on the inland plateaux. There are other river deltas that I know where one finds an odd case of hæmaturia, but the source of these rivers was in the coast belt.

One other point I desire to make is that the disease is to be found in many widely separated countries—the Pacific Islands (Case), Australia (Cleland), America, France, Belgium, etc., and in these different countries the vegetation varies tremendously. Plants containing oxalic acid, however, have a world-wide distribution, which bears out my contention that if the vegetation is the cause of hæmaturia, it is not confined to one species of plant.

Many investigators have claimed that hæmaturia was a contagious disease—Detroye, Moussu, Bowhill, and Kalkus.

During the past two years I have experimented on seventeen animals, and have tried to infect them in a variety of ways—by cohabitation, by injecting urine into the bladder, by giving it by the mouth, by the injection under the skin of blood and urine—but without success. From this and other observations in the field, which I have already recorded, I consider the matter settled. I will finish this part of my report by quoting from Moussu's excellent article on the disease. Several references are made to other workers; some of their conclusions are similar to mine, except that they do not go so far. For instance, Pinchon believed its appearance was due to changes in cultivation (clearing), which in 1830 and 1860 completely altered the general appearance of the country. Senoir had much the same ideas; Boudeaud and Cruzel thought the disease was due to poor feeding. This idea, though quite wrong, for animals may starve to death without showing signs of hæmaturia, backs up my statement that as a rule the diseased animals are poor specimens of their respective breeds. I do not mean that all cases are thin, but they are generally rough animals, receiving little care and attention. In talking over the benefits derived from cultivation, with Mr. Moore, superintendent of this farm, he gave me an idea which I believe is correct—that cultivation and reseeding meadows may not check the acidity of the soil, but that it will tend to crowd out the acid plants, and that when liming is practised it tends to encourage lime-loving plants, which also displace the acid ones.

Moussu recommends improved farming methods, such as the cultivation of pasture fields, and the application of superphosphate of lime in particular. He says that Boudeaud has seen the disease disappear when these improvements had been put into practice on farms where the disease had been in permanent possession.—*Report of the Vety: Dir: Genl:, Dept: of Agric:, Canada.*

* A very complete list of references on Oxaluria may be found in Noordenss' "Metabolism and Practical Medicine," vol. 3, pp. 1053-1054.

The late Mr. H. E. Baskerville Walton, Brighton, expressed in his will his desire that "no gloves, hatbands, scarves, plumes, or other disgusting paraphernalia of the usual undertakers" should be worn at his funeral, and the horses employed should be "brown, bay, grey, or chestnut, not the usual undertakers' slab-sided Belgian horses, behind which no gentleman would care to be seen either dead or alive."

Piroplasmosis in New South Wales.

After a continuous fight of about nine years on the part of the New South Wales authorities on its northern border against the introduction of ticks and tick fever from Queensland, pathogenic ticks have at last succeeded in penetrating the defences at one part with the result that piroplasmosis (tick fever or red water) has appeared on a farm on the border adjacent to Queensland, and a number of cattle have died of the disease.

Although the clinical features and lesions were indicative of piroplasmosis, the pathologist making an examnation of the specimens submitted did not feel justified in arriving at a positive diagnosis without demonstrating the causal organisms, *viz.*, *Piroplasma* or *Babesia bigeminum*. This could not be done, principally because the blood smears were so badly prepared that no blood corpuscles could be detected in the mass. As a result of this, some delay ensued, until another animal became sick. On this occasion, under special directions, blood smears were prepared that could be examined microscopically, and piroplasmosis was diagnosed definitely. During the interval the Stock Department had not been idle. Measures were immediately taken, as if the disease had been properly diagnosed from the outset—the whole farm was placed under strict quarantine.

At present, the farm, which abuts upon the Queensland border, is subjected to a system of control which aims at getting rid of the cattle exposed to infection, and with them, the pathogenic tick, so as to safeguard the State, with as little loss and inconvenience to the owner of the cattle as possible.

In dealing with diseases of the nature of bovine piroplasmosis, measures eminently suitable for some bacterial and protozoal diseases cannot be applied. The immunity resulting from an attack of this form of piroplasmosis is not an *immunitas sterilans*, for the causal organism is harboured in the blood for a varying period after recovery: consequently, such an animal is always a potential source of infection. Infection cannot be naturally transmitted to healthy animals unless the intermediate host—the tick, be present.

It must be accepted as certain that not all the animals contracting piroplasmosis in the present outbreak have died, but that some have recovered, and are carrying the causal organism is their blood. The farm in question has, from the time ticks first made their appearance on the border, been exposed to the invasion of ticks every year, and they have from time to time been detected upon cattle. These infestations took place in spite of the most vigilant care, and so long as nothing is done on the Queensland side of the border, it is reasonable to anticipate that ticks will again gain admission to the now infected farm. So long as the present cattle remain on the premises, the recovered ones will act as a centre of infection for the tick to spread it.

There are several measures by which the danger of spread of the disease could be effectually suppressed, and it should be remembered that far more drastic remedies could be applied in the present case, where the infected area is small, than would be practicable if the area were a large one.

The first course that suggests itself is to slaughter all the cattle exposed to infection, or to remove them across the border into Queensland, after dipping. No objection could be raised against the latter proceeding, as that locality is already heavily infected. The farm would then have to be kept free from cattle for a period determined by the life history of the cattle tick: thus the whole of the ticks now on the farm would be starved out, or, if animals other than cattle were kept on the place in the meantime, the progeny of such ticks would become non-pathogenic. The farm could then be re-stocked with cattle.

Another, but less drastic, measure could be adopted, by which the farm is not left idle in the meantime, that is, first to remove all the present cattle in the way indicated, admit clean, non-infected cattle at once to the farm, in order that the progeny of the ticks dropped from the previous cattle might be picked up and destroyed by dipping the animals. Then, when the ticks had been got rid of, this second lot of cattle could be disposed in the same manner as the first and the farm re-stocked again without any risk. This would involve little or no loss to the owner, what loss did occur being borne by the State. Such a method, however, is complicated. A drawback is the possibility that the second lot of cattle may pick up infected ticks and thus become affected with piroplasmosis. In such a case the authorities would be in a position of "as you were."

The third method, and the one that it is believed has been adopted by the State authorities, is to leave the original cattle upon the farm and to dip them regularly at as short intervals as possible. Meanwhile, the farm is to be kept in strict quarantine. When the inspectors are satisfied that the whole of the ticks upon the place have been destroyed and that none have had opportunity to mature upon the cattle, to drop off and to deposit their ova, the animals could be disposed of as indicated and the farm re-stocked. This method, if carried out properly and with no relaxation of vigilance, should be efficacious, but it should be remembered that infected cattle are in the meantime on the farm, and, unless every precaution is taken, there is a danger of the infected area spreading.

The boundary between the heavily tick-infested areas of Queensland and the tick-free country of New South Wales is, in many places, only a wire fence. Although a force of tick inspectors is constantly engaged in preventing the passage of ticks across the border, there are a variety of ways in which the tick can evade their vigilance and make its way on to clean territory in New South Wales. This has happened on a number of occasions, and will continue to occur, in spite of all that can be done. The only way to remove the menace is for action to be taken on the northern side of the border to clear up the ticks there. Apparently such action is not contemplated by the northern State, and as long as things remain as at present, all that New South Wales can do is to not relax any precautions to keep the pest out, and, when it does gain admission, to take every measure at once to eject it.

It is suggested by some that when a farm does become infected, all of the surviving cattle should be inoculated in order to prevent further loss. Such proceeding may be a wise one where the whole of the surrounding country is infected, as in parts of Queensland, but in New South Wales it is a counsel of despair, as it tacitly admits that the disease cannot be eradicated, and that the mortality must therefore be minimised by infecting the susceptible cattle artificially.

In dealing with the prevention of tick infestation and the tick-borne disease, piroplasmosis, the public should remember that, without their assistance, the Government officials are considerably handicapped in their work, and farmers and others must be prepared to put up with some amount of inconvenience in the threatened localities. At present, unfortunately, there appears to be too much of that very common tendency of thinking that certain measures are excellent when they are applied to the other man, but that they are iniquitous when they have a personal application. In connexion with tick fever, farmers and others have bitterly complained of restrictions and other precautions against infestation, but as soon as the danger makes its presence felt, there is a tendency to rush to the other extreme, and complain that the Government has been lax in carrying out its duties.

On the Northern Rivers and in parts of Southern

Queensland, piroplasmosis or tick fever is often confounded with a condition which existed long before ticks made their appearance—enzootic hæmoglobinuria or, as it is known further south, Illawara red water. The latter disease is probably not of bacterial or protozoal origin, but is possibly due to the presence of large amounts of oxalates in the food.

The vexed question of Federal or State action crops up in connection with the control of the tick. The campaign undoubtedly costs New South Wales a large sum annually, and this is chiefly due to negligence in the past and apathy in the present on the part of Queensland. Primarily, the work of tick control benefits the farmers in the former State, but, incidentally, the work is benefitting the Commonwealth, because, in spite of ill-informed opinions to the contrary, there is nothing climatically to prevent the tick spreading over the greater part of the south of Australia.

Infestation is always coming in from Queensland to New South Wales, and the latter State can do nothing to attack the enemy in its own camp. On the face of it, it appears that a good case has been made out for Federal, rather than State control of the work of tick eradication, as at present the tick is not only a source of enormous economic loss to the Commonwealth, but it is an ever present danger to the herds in unaffected localities.—*The Medical Journal of Australia.*

Practical Bacteriology in Queensland.

No work tends more towards national prosperity in cattle and sheep grazing countries, such as Queensland is, than combating those formidable and ever-working foes to the pastoralist and farmer, the germs of stock diseases. A well-equipped experimental station has been established near Brisbane, where research work is carried on on the most modern lines. The practical side predominates here—for instance, the study of the conditions under which meat is tinned at the various meat works of the State. When the industry was first started there was a lot of trouble concerning "blown tins," but this has been surmounted so completely that meat canned at the Queensland factories may be kept quite safely for many years.

A visitor to the Bacteriological Institute was shown a bottle of culture of anthrax germs marked 1886. "This is tested every year," said the Government bacteriologist. "We take a tiny morsel and put it into a rabbit or a guinea-pig, and in three days the animal is dead." Thirty years old, these germs are as virulent as when they were put up.

In the "blackleg vaccine" incubating room the work going on is the preparation of cultures which render calves immune from the dread and always fatal "blackleg." The bacteriologist prepares two cultures, and "properly administered," he says, "we always get 100 per cent. of results." In other words, every calf so treated lives. Originally the "culture" was produced at the famous Pasteur Institute in Paris, but the Queensland bacteriologist has evolved a superior method.

Tick fever is troublesome in the Queensland cattle breeding districts, and this institute is concerned largely with the study of the life history of the tick. A rack containing electric light globes, placed upside down and stopped with cotton wool, serves as a "nursery" for vast colonies of young ticks.

The process of making cheese by lactic acid bacilli is available for Queensland dairy people at this bacteriological station. A curious relic was shown—a splinter of wood taken from the foot of a boy who died in 1894 from lockjaw. He was climbing a fence when the splinter entered his foot; he was dead in two days. Said the attendant: "Every year since we have just taken this splinter out and jabbed it into some animal, and every time that animal has died!"

Stomach Worms in Sheep.

In zoology the worm that causes so much trouble in the stomach of the sheep is called *Haemonchus contortus*. It is a nematode. An old shepherd called it "the little devil that collects internal revenue from sheep and lambs." This may not picture the worm, but it gives a vivid idea of the result of its attack directly on sheep and indirectly on the owners of the animals whose stomachs are invaded.

The stomach worm can be found in many parts of our country, and for all we know it may have been with us long before it visited its savagery on our flocks. We got our first sad experience with it, however, about twenty-five years ago, and its ravages have been most pronounced in the corn-belt region, in the east, in the south, and in southern Canada. It has been a serious pest in most places where farm flocks are kept, but as yet it has not noticeably affected the sheep on our western ranges.

In the early '90's lambs died like flies in the middle west. In a short time flockowners learned that they had a new enemy to deal with, one which no one seemed to know much about except that it was mighty hard on lambs. The life history of the worm was unknown, and therefore we knew nothing that could be depended upon about sources of infestation and methods of eradication. Since then we have learned a few things about the worm; but it is still an insidious enemy that is sure to bring trouble to the farm flockowner who is not always keenly alive to the possibility of its being present.

Life history. To Ransom of the Zoological Division of the Bureau of Animal Industry more than to anyone else belongs the credit of determining the life history of the stomach worm. He learned what takes place from the time the worms mate until the sheep becomes infested or perhaps re-infested. The mating process takes place in the abomasum, where the worms live while in the host, except a few that drift over into the duodenum. The eggs, which are microscopic, are deposited in the abomasum, and they pass out of the body in the fæces. Heat hastens the time of hatching, which may occur in a few hours, days or weeks, according to the temperature. Either dryness or a freezing temperature will kill the eggs and the real young larvæ. The newly-hatched larva feeds upon the fæcal matter in which it lives until it develops into the final stage outside the sheep or host. This is the final free-living stage, and the time from hatching until it is reached is also a matter of temperature, ranging from a few days to a few weeks. The larva now becomes enveloped in a chitinous sheath.

At temperatures above 40° F. the ensheathed larva or embryo can move about (very slowly, of course), and it becomes more active as the temperature rises. It is unlike newly-hatched larvæ and eggs, in that it is not killed even by long periods of freezing and drying. When the vegetation is wet from rain or dew the sheathed larvæ crawl up grass or weed blades and stems, coming to rest when the moisture evaporates and resuming the journey when the vegetation is again wet. In this way they get up high enough to be taken in by a sheep or lamb when grazing. After being swallowed they continue their development and attain maturity in two or three weeks.

So far as the writer is aware, no one has yet determined how long an individual worm may live in the stomach of the host. If, as is maintained, none of the eggs hatch in the stomach, then it would seem possible to determine this point, and it would be valuable information. The writer has observed heavy infestation in sheep after they had been confined continually in dry lots during the winter. Lambs born in the same dry lots were carried through entire summer seasons without becoming infested. Therefore it would seem that

the worms that were in the sheep when they came from the pastures remained in them throughout the entire winter. Mature stomach worms are from three-fourths to an inch in length. They appear to be red and white in colour, and closely resemble a white and red thread intertwined. They are to be found in the abomasum or fourth stomach, which is oblong, resembling a pear in shape. In conducting a post-mortem for the purpose of determining whether there is an infestation of stomach worm it is well to examine the animal shortly after death, before it has become cold, for otherwise the worms may be dead and disintegrated beyond recognition. Before opening the stomach, it should be placed so that a slit can be cut in it which will permit of examining the liquids before they escape. If many live worms are present they can be seen wriggling in the liquids.—W. C. Coffey, Illinois Experiment Station, in *The Breeders' Gazette*

Diagnosis of Human Glanders by Blood Cultures.

Kostrzewski (*Centralbl. f. Bakt.*, vol. 77, p. 418, 1916) has drawn attention to the possible diagnostic value of blood culture in glanders. A soldier was attacked by fever and joint pains and had a painless swelling over the upper part of the sternum, which was incised, and yielded a small amount of thick yellowish-brown pus. After twelve days of illness multiple hard subcutaneous nodules developed. Pus obtained from these showed scanty bacilli on microscopic examination, but cultures remained sterile, and intraperitoneal inoculation into guinea-pigs yielded negative results; at the same time the culture in 8 c.cm. of the blood in 50 c.cm. bouillon yielded a growth of *B. mallei*. Later there appeared the characteristic papules turning into pustules, and death occurred with the clinical phenomena of acute glanders infection after a duration of seventeen days. The negative findings with the pus while the blood culture gave a positive result exemplifying the important information which may be obtained from this procedure in cases of generalised infection.

ARMY VETERINARY SERVICE.

Extracts from *London Gazette*,

WAR OFFICE, WHITEHALL, Aug. 26.

REGULAR FORCES. ARMY VETERINARY CORPS.

Temp. Lieut. to be temp. Capt.:—J. C. Broad, from R. Mar., (Aug. 22).

Aug. 29.

Temp. Lieut. to be temp. Capt.:—S. Hirst (Aug. 16).

Aug. 30.

Hon. Vety. Col. A. E. Queripel, ret. pay, relinquishes the temp. rank of Col. on ceasing to be employed (May 7).

Temp. Lieut. J. J. MaGrath relinquishes his commn. on termination of engagement (Aug. 19).

To be temp. Lieuts:—J. Bell, S. J. Cotton, W. M. Rouse (Aug. 15).

TERRITORIAL FORCE. ARMY VETERINARY CORPS.

Aug. 26.

Lieut. to be Capt.:—G. B. Cooper (May 5).

Aug. 28.

Maj. (temp. Lt.-Col.) J. K. Grainger relinquishes his temp. rank on vacating appmnt of A.D.V.S. (Aug. 12).

Prisoner in Turkish hands:—Lieut. E. S. Farbrother, (Indian Army Res. of Off.), attached A.V.C.

The following casualties are reported:—

WOUNDED—Sgt. F. Price, 48587, Canadian A.V.C.

DIED—L.-Cpl. J. Francis, 1096.

SUBSCRIPTIONS TO R.C.V.S.

The Secretary of the Royal College of Veterinary Surgeons begs to acknowledge the receipt of the following subscriptions for 1916 to the College funds:—

J. J. Aveston, Bath	£1	1	0
L. Danels, Capt. A.V.C.	1	0	0
Arthur Ellison, Capt. A.V.C.	1	1	0
Duncan McLeod, Glasgow	1	1	0
Oscar Stinson, Marden, Kent	1	1	0
Previously acknowledged	746	7	6
	£751	11	6

Personal.

TUTT—BERRY. On the 23rd August, at St. John's Church, Sevenoaks, by the Rev. S. M. Chapman, John Francis Donald (Lieutenant, Army Veterinary Corps), only son of Mr. and Mrs. J. B. Tutt, of St. Cross, Winchester, to Florence Edith, third daughter of Mr. and Mrs. Richard Berry, of St. John's, Sevenoaks.

OBITUARY.

ROBERT W. CLARKE, M.R.C.V.S., Capt. A.V.C. (T.F.), Beech House, Wragby, Lincs.
Graduated, Lond: Dec., 1886.

Capt. Clarke's death in hospital at Cairo, from dysentery, has been reported by cable.

"Capt. Clarke gave up an extensive practice to join the yeomanry soon after the war broke out, and he went out with the first dratt in September last. He was on board the 'Mercian,' on which the late Lord Kesteven received fatal injuries, when she was shelled and chased by a U boat in the Mediterranean, and he was in the water many hours before being picked up.

He was well-known in Horncastle and district, for he resided in the town for many years, as did his father before him, carrying on the business of a veterinary surgeon over a wide area. He then moved to Wragby, where he enjoyed great popularity with all classes.

Capt. Clarke leaves a widow, a daughter of Mr. S. Ward, of Barton-on-Humber, and two little girls. He was a prominent Freemason, and in his younger days a winner of many prizes on the cycle track.—*Horncastle News.*

THEODORE CHARLES TOOPE, M.R.C.V.S., Dover, Kent.
Lond: April, 1880.

Mr. Toope's death occurred very suddenly at 1 a.m. on Thursday morning. He was Hon. Secretary to the Southern Branch of the National V.M.A., and to the South Eastern V. Society.

JOSEPH BIBBY, M.R.C.V.S., Daltongate, Ulverston, Lancs.
Graduated, N. Edin: March, 1896.

Mr. Bibby died on August 25th, aged 52.

ALEXANDER M. MACDOUGALL, M.R.C.V.S., 36, Longrow, Campbeltown, Argyllshire. Glas: Dec., 1894.

Mr. MacDougall, who was the beloved husband of Agnes R. McLatchie, died on August 27th, aged 42.

Army Veterinary Comforts.—Australia.

The sock competition and gift evening in aid of the Army Veterinary Comfort Fund turned out a huge success. The secretary of the organising committee, Mrs. T. Wynn-Watkins did splendid work, in which she was enthusiastically supported by an energetic committee. The big concert hall of Messrs. Paling and Co., which was lent free for the occasion was packed with friends of the object, and an excellent entertainment, arranged by Miss Amy Perrin and contributed by high-class artistes, was enthusiastically applauded by the audience.

The gift table was loaded with comforts.

Professor J. Douglas Stewart, President of the Fund, announced during the evening the donation of a cheque for £50 by Tattersall's Club. Altogether the efforts of the committee have resulted most satisfactorily, horse-owners, stock agents, and others having responded liberally to applications for assistance.

At first few people seemed to appreciate the splendid work being done by the Veterinary Section in Egypt; but it seems to be dawning upon horselovers gradually that they may contribute something to the comfort of our horses at the front by bestowing some attention upon the men whose duty it is to give the best possible treatment to sick and injured equines. It may not be out of place to mention that the Veterinary Section has had the care of twice as many horse patients as this unit was designed to treat. This has meant most strenuous work, and what the boys have done during the past eighteen months in the equine hospitals, not to mention the saving of valuable horses, can scarcely be fully appreciated by people here.—*Sydney Stock and Station Journal.*

Action between Veterinary Surgeons.

At Duns, Sheriff-Principal Chisholm has issued his decision in the case in which Alex. Lawson, Norham, a retired veterinary surgeon, sues Wm. Lothian, Duns, veterinary surgeon, for payment of services rendered. In his condescendence pursuer stated that in September, 1915, he took over defender's practice during his illness. He expected that arrangements would be made to relieve him at the end of a week. When that period expired no arrangements had been made, and pursuer continued to carry on defender's practice until 16th November. In defender's first plea-in-law, he pleaded that the averments of the pursuer were irrelevant and insufficient to support the conclusions of the action. Sheriff Macaulay Smith, on 23rd June, issued an interlocutor repelling this plea and allowing a proof. From this decision the defender appealed, with the result that Sheriff Chisholm has reversed the decision of the Sheriff-Substitute, and has sustained the defender's plea-in-law, and dismissed the action with costs.—*North British Agriculturist.*

[*V.R.*, June 10, p. 563.]

The Physics of a Surgical Dressing.

The following is one of many communications on this subject which have appeared in the medical journals during the last two years.

"To my mind Major C. W. Duggan holds the key of the whole argument, namely, that antisepsis and osmosis should be our guides in treating wounds not aseptic. Provided the dressing is not left on the parts too long, to become more of a menace that a benefit, I consider that the drier the wound is kept the better. It must be remembered that a dressing is a compromise, and in many superficial wounds the advantage lies in applying as little dressing as possible. Provided the parts are kept clean any kind of dressing, no matter how effective, is a hindrance; the wound will do better if left uncovered. With deep-seated wounds, or wounds other than superficial, the case is rather different. Here we are concerned with a foul opening leading down to tissues more or less damaged, and that treatment which removes the discharge most effectively whilst keeping the surface sweet will give the best result. It is not a matter of moist *versus* dry dressing, but rather one of effective disposal of a discharge loaded with deleterious agents which may reinfect the surrounding parts. No doubt a wet dressing covered with impermeable material, if the parts are thoroughly drained and the dressing not allowed to become saturated with discharge, may not do much harm; indeed, I believe the healing process may be hastened. But in such a case the dressing should be renewed sufficiently often to keep the surface of the wound antiseptic; the frequency will depend upon the depth and character of the wound and the thoroughness with which antiseptics are brought into contact with the infected focus.

If the wound is septic, make it aseptic. Frequently we cannot attain to this perfection, but in all circumstances this end must be kept steadily in view, for until the wound becomes aseptic there can be no true healing process.

In general practice many so-called discoveries of to-day and yesterday have been in use time out of mind, and Sir Almroth's saline treatment of wounds amongst others. I know that my neighbours in Yorkshire, like myself, have used it for long. I have discarded impermeable coverings for dressings for a great many years. I very soon discovered their danger in a wide practice where patients cannot be seen every few hours.

I give this instance of the ineffectiveness of an impermeable dressing over a wound. An armourer-sergeant belonging to this town was sent home suffering from a septic finger which had been treated for more than a month. The finger had the usual wet dressing covered with impermeable oiled silk. I gave it a very thorough washing with a weak antiseptic, clipping away all dead skin, and clearing out the wound as well as I could, and then put it up in a dry dressing. It healed almost directly.—I am, etc.,

Helmsley. ALEXANDER BLAIR, M.D."

REVIEW.

TEXT-BOOK OF GENERAL THERAPEUTICS FOR VETERINARIANS. By EUGEN FRÖHNER, Privy Councillor and Professor of Special Pathology and Therapeutics in the Veterinary College at Berlin. Authorised Translation from the Fourth Revised German Edition by LOUIS A. KLEIN, Professor of Pharmacology and Veterinary Hygiene in the School of Veterinary Medicine at the University of Pennsylvania, and Dean of the Faculty. Pp. xij+293. Price 12/6 net. (J. P. Lippincott Company, Philadelphia and London, 1914).

This is an American translation of the fourth edition of one of four companion works by the celebrated German authority, Prof. Fröhner. The other three, which deal respectively with pharmacognosy and pharmaceutical chemistry, prescription writing, and toxicology, have not yet been translated into our language.

At the commencement, some sixteen pages are devoted to a succint and very interesting outline of the history of therapeutics from the earliest times down to the present day. The succeeding sections deal separ-

ately with the therapeutics of diseases of the different organs and systems of organs, antiparasitics, disinfection, disinfectants and antiseptics, antidotes; protective, curative, and diagnostic inoculation, hydrotherapy, massage, electrotherapy, bleeding, etc., and the whole forms a concise survey of almost the whole field of veterinary therapeutics. The lines consciously followed are those of a short, concise, and didactic presentation of the classic views on the subject; and—again consciously, as is indicated in the preface—the author refrains as far as possible from raising any of the doubts which so often assail the modern therapeutist.

The work being thus strictly orthodox—from the German point of view at least—and not as a rule very profound, little detailed criticism is necessary. Perhaps the most valuable portion is that dealing with disinfection, disinfectants, and antisepsis, which really goes more deeply into the subject than some clinicians have yet gone. Some of the most recent developments in wound treatment are necessarily absent; but on the whole this section is well worth reading. On the other hand, some of the less important subjects receive very scanty consideration—less than a page, for instance, is devoted to the technique of electro-therapy, and the Roentgen rays and radio-therapy together are dismissed in three sentences. The German regulations governing disinfection for the various infectious diseases are included in the translation; but, though doubtless useful as models, they obviously can serve no other purpose to English readers. As was to be expected, we find not a few divergencies from the orthodox English views of posology and therapeutics, many of which increase the interest of the book to the qualified practitioner. Most are familar to students of Continental therapeutic ideas; but it is very difficult to understand why hyocine (scopolamine) should be classed together with atropine on pages 59 and 95, as a nervous and cardiac stimulant, while its sedative action is not mentioned, and nothing is said regarding hyoscyamine.

The book is well written; but we hardly anticipate any great demand for it in this country. It has been written mainly for German students and young graduates; and there is quite sufficient difference between German and English therapeutic teaching to impair its utility for students reading for examinations here. To the practitioner, a fuller and less condensed work would have been more valuable. The chief recommendation of this one appears to be that we have no other textbook covering exactly the same ground. Undoubtedly it will be useful for reference and comparison; but it cannot be called indispensable.

W. R. C.

Experiments on Animals.

A Home Office return relating to experiments on living animals in 1915–16 was recently published. In this it is shown that 70,573 experiments were performed, 16,680 fewer than in 1914. Twenty-one new premises were registered, of which 13 were laboratories connected with naval or military hospitals and sanitary institutions. There are 664 licensees, of whom 322 performed no experiments. Some 67,802 inoculations, hypodermic injections, &c., were given without anæsthenics—as is the usual custom; 2771 experiments were carried out under anæsthetics. Upwards of 11,000 experiments in cancer investigation were carried out, the majority being inoculations into mice.

DISEASES OF ANIMALS ACTS 1894 TO 1914, SUMMARY OF RETURNS.

Period.		Anthrax		Foot-and-Mouth Disease.		Glanders.†		Parasitic Mange. ‡		Sheep Scab.	Swine Fever.	
		Outbreaks (a)	Animals.	Outbreaks (a)	Animals.	Outbreaks (b)	Animals.	Outbreaks (b)	Animals.	(b)	Outbreaks (a)	Slaughtered. *
GT. BRITAIN. Week ended Aug. 26		7	10			2	2	15	32	2	63	32
Corresponding week in	1915 ...	6	6			2	2	8	16	1	56	175
	1914 ...	6	9	3	17	1	1	2	2	1	52	180
	1913 ...	8	9			3	3	18	29		44	505
Total for 35 weeks, 1916		373	443	1	24	36	89	1712	3831	184	3296	8621
Corresponding period in	1915 ...	418	478			37	66	‡581	‡1263	160	2992	13329
	1914 ...	518	564	14	91	73	219	1521	2633	153	2821	28939
	1913 ...	381	420			115	291	1912	3855	129	1716	23112

‡ The Parasitic Mange Order of 1911 was suspended from 6th August, 1914, to 27th March, 1915, inclusive.

(a) Confirmed. (b) Reported by Local Authorities. † Counties affected, animals attacked:—London 2

Board of Agriculture and Fisheries, August 29, 1916 Excluding outbreaks in army horses.

IRELAND. Week ended Aug. 19		...	...	...	...	...	...	Outbreaks 1	11	5	36
Corresponding Week in	1915 ...	...	...	...	...	...	...	3	7	3	34
	1914 ...	...	...	...	...	...	...	1	5	3	23
	1913 ...	...	...	...	...	...	...	...	8	4	47
Total for 34 weeks, 1916 ...		3	7	...	...	...	...	47	273	219	1332
Corresponding period in	1915 ...	1	1	...	...	1	...	52	282	173	983
	1914 ...	1	1	76	957	...	...	59	385	153	767
	1913 ...	...	...	...	...	...	...	96	366	110	660

Department of Agriculture and Technical Instruction for Ireland, (Veterinary Branch), Dublin, Aug. 21, 1916.

NOTE.—The figures for the Current Year are approximate only. * As diseased or Exposed to Infection